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DR. EDMUND CLARK SANFORD will be installed as president of Clark College on February 1.

A. H. SUTHERLAND, Ph.D. (Chicago), of the Government Hospital for the Insane at Washington, has been appointed instructor in psychology in the University of Illinois.

DR. ISSAI SCHUR has been promoted to an associate professorship of mathematics in the University of Berlin.

DR. KNOLLER has been appointed associate professor of aeronautics in the Vienna School of Technology.

DR. DIETZIUS has qualified as docent for aeronautics in the Berlin School of Technology.

#### DISCUSSION AND CORRESPONDENCE

##### FALL OF A METEORITE IN NORWOOD, MASSACHUSETTS

DURING the night between October 7 and 8, 1909, a meteoric stone fell to earth on the farm of Mr. W. P. Nickerson, of Norwood, Mass. The meteorite is a ham-shaped mass of very hard gray stony material, much corrugated on the surface, about two and one half feet long in its greatest dimension, one foot to nearly one and one half feet broad, and varying from one foot to one half foot in the third dimension. I estimated its volume as about 1.75 cubic feet, its weight as perhaps 275 pounds, and its density as not much over 2.5. The material has a flow structure, like that of an ancient lava which has solidified during flow, but is completely crystalline. It is, therefore, entirely different from any meteorite on record. The stone is about as hard as petrosilex, and has a slight salty odor. Laminæ from 2 to 4 millimeters thick, perhaps on an average 5 to 10 mm. apart, disposed in a parallel order, project from the surface to the extent of several millimeters, resembling in this respect a much weathered piece of laminated felsite, except that there has been no chemical alteration of the superficial layer such as occurs in felsitic weathering. The laminæ are distinctly parallel, their general direction transverse to the longer axis of the

mass. The projections, although rounded, exhibit a remnant of crystalline form. They are in fact phenocrysts of plagioclase feldspar. Several small cavities, a few millimeters in diameter, are recognizable, but the greater part of the surface is without any pitting, other than that of the normal, and everywhere present, structural corrugation.

The bolide fell vertically through the bars of a gateway, breaking every bar and burying itself in the sand directly underneath to a depth of three feet. It was this fresh break which attracted the attention of one of the farmer's men in the early morning of Friday, October 8. The top of the stone was about six inches below the level of the surface in the interior of a cavity in the ground not much over a foot wide. The top of the stone was still appreciably warm the following morning at 7 A.M., according to Mr. Nickerson, and the bottom was decidedly warm ("hot" is the word used by the man who first felt it). A neighbor, Miss Stuart, of Westwood, in whose candor and honesty I have complete confidence, arrived at the spot just after the stone had been exhumed, handled its surface without gloves, and declares that it was so hot that she did not care to keep her hands on it very long. One of Mr. Nickerson's hired men independently told me the same. The moisture in the surrounding earth had been converted into steam which, in blowing off during its escape, had brushed off, and thus cleansed the *lower* surface of the meteorite—the surface of impact—which was cleaner than the upper surface, a fact which attracted the attention and surprise of the diggers who could not account for it. The sand had been so thoroughly dried that it sifted back into the hole as the stone was pried out, although the surrounding soil of the pasture was damp. The bolide passed through the bars so swiftly that the rather weak side supports were not injured. One hard wood bar was cut with a sharp fracture. Some smaller and weaker ones were more or less torn.

It seems to me probable that when a bolide succeeds in penetrating to the denser layers of the atmosphere at a very low angle, the up-

ward elastic reaction of the air becomes so great that the meteorite rebounds, but if the angle of the path is a high one, atmospheric friction and impact retard the meteoric velocity to so great an extent that gravity gets the victory, and the last part of the meteor's fall is vertical. If this conclusion is correct, there should be some evidence that bolides which strike the ground fall more often than not in a vertical direction. I am not aware that such evidence has been sought, or especially noted. The present instance is so well authenticated, that it seems worth putting on record. Subsequent investigation has proved that the fall of the meteorite occurred at about quarter before seven o'clock on the evening of Thursday, October 7, as witnessed by several people in Norwood.

FRANK W. VERY

WESTWOOD, MASS.,

October 12, 1909

#### A LABORATORY ILLUSTRATION OF BALL LIGHTNING

IN Dr. Elihu Thomson's address at the opening of the Palmer Physical Laboratory at Princeton University he made, with regard to ball lightning, the statement, "The difficulty here is that it is too accidental and rare for consistent study, and we have not as yet any laboratory phenomena which resemble it closely."<sup>1</sup> This suggested to me that a phenomenon which I witnessed some six or seven years ago might be worth recording.

With a copper wire a student accidentally short-circuited the terminals of an ordinary 110-volt circuit. I happened at the time to be a few meters from him and to be looking toward the terminals. At the instant of the short circuit I saw an incandescent ball which appeared to roll rather slowly from the terminals across the laboratory table and then disappeared. As I remember it, I should say that the ball may have appeared to be about three centimeters in diameter. I think no one else in the room saw anything more than a flash of light—much as if a fuse had blown. On the table where the ball had rolled we found a line of scorched spots, as if the ball had bounced along the table and had scorched the wood wherever it touched. As I remem-

ber them, these scorched spots were rather close together, perhaps not more than one or two centimeters apart. In the top of the table was a crack perhaps a millimeter or two wide, and at this crack the scorched line ended. In a drawer immediately under this crack we found a tiny copper ball, perhaps a millimeter in diameter. Apparently the ball that rolled along the table was incandescent copper vapor, although my memory of it is rather of a yellow-white than of a greenish light.

The above suggested the possibility of a laboratory study of a phenomenon which may very possibly be similar to that of ball lightning, but I have never attempted to repeat the experiment.

A. T. JONES

PURDUE UNIVERSITY

#### BALL LIGHTNING

TO THE EDITOR OF SCIENCE: In the address on "Atmospheric Electricity" by Professor Elihu Thomson, on pages 867 to 868 in the issue of December 17, reference is made to lightning in the form of a ball of fire. This calls to my mind an experience which I had some fifteen years ago while watching a heavy electrical storm. I observed what appeared to be a ball of fire between two and three feet in diameter rolling along the street. It was also accompanied by several others of smaller size. This appearance occurred just after a very heavy electrical discharge to a telephone pole some few squares away. The discharge along the telephone wire heated the wire to red heat. The wire broke on account of this heating and a section of some considerable length was hurled along the street with a whirling motion. The rapidity of the rolling motion gave the appearance of a ball, as it also gave a forward motion to the ball of fire. Subsequent investigation revealed the two ends of the wire dangling from adjacent poles with a considerable length of the wire missing. I beg to suggest that the rapid heating of metal particles in some manner similar to this may be the cause of many of the so-called balls of lightning.

LOUIS M. POTTS

BALTIMORE, MD.,

January 10, 1910

<sup>1</sup> SCIENCE, XXX., p. 868, December 17, 1909.